The Basics

ECHO has been replaced by the **Common Metadata Repository (CMR)**, a high-performance, high-quality, continuously evolving metadata system that catalogs all data and service metadata records for the EOSDIS system and will be the authoritative management system for all EOSDIS metadata.

The information contained within this ECHO wiki is now archived for historical reference. Please navigate to the **CMR wiki pages**, or to the **CMR Overview page** on **Earthdata**.

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The Basics

This chapter describes the basic terms and concepts used in subsequent discussions of the Web Services API and the ingest process.

ECHO Web Services

To access a particular service through the ECHO Web Services API, refer to the resources section of each ECHO system's information page on the ECHO website (http://www.echo.nasa.gov/ >> ECHO Systems).
The table below shows each ECHO service and a brief description of its capabilities. To access the Web Service Description Language (WSDL) document that describes a service, attach the suffix .wsdl from the API page following this format: http://<mode>.echo.nasa.gov/echo-wsdl/v10/<Service Endpoint>.wsdl. Service Endpoints are found in Table 1.

Description of Data Partner-Related ECHO Web Services

ServiceName	Description	ServiceEndpoint
Authentication	Facilitates ECHO token generation..	AuthenticationService
Catalog	Facilitates data discovery.	CatalogService

Data Management	Facilitates access control management , order option management, reconciliation, and holdings analysis.	DataManagementService
Extended Services	Facilitates creating, retrieving, updating, and deleting web services within ECHO, including interfaces, implementations, advertisements, and GUIs .	Extended ServicesService
Event Notification	Facilitates the management of metadata event subscriptions.	EventNotificationService
Group Management	Facilitates user group management used by ECHO's access control capability.	GroupManagementService
Order Management	Facilitates the creation, submission, and retrieval of user submitted metadata orders.	OrderManagementService
Order Processing	Facilitates order fulfillment communication from Data Partners to ECHO.	OrderProcessingService
Provider	Facilitates provider registration, information management, and policy management.	ProviderService
Subscription	Facilitates the creation and management of metadata subscriptions.	SubscriptionService
Taxonomy	Facilitates management of data taxonomies useful for classifying services associated with ECHO's data holdings.	TaxonomyService
User	Facilitates user account creation and maintenance.	UserService

ECHO Globally Unique Identifiers

An ECHO Globally Unique Identifier (GUID) is a mostly random number with a large number of unique keys that is assigned to an item by ECHO. A GUID is normally a 16-byte (128-bit) number in hexadecimal form.
ECHO uses GUIDs to identify items such as users, providers, contacts, orders, etc. Client applications use GUIDs to find and operate on items using the ECHO API.

ECHO Entities

This section describes several high-level concepts that help you understand the ECHO system. The following is a selected list of entities.

Users

The most basic entity in the ECHO system is a **user**. Each user is identified by a unique user name. There are two types of users: **registered users** and **guests**. Registered users can save information they plan to use in their next session. Guests have the ability to do many of the things registered users can do, but they cannot count on persistent access to information across sessions in addition to other limitations.
To see a detailed breakdown of functionality by user type and role type within ECHO, see Appendix B, Functional Breakdown By User/Role Type.

Groups

The term **groups** refers to an aggregating mechanism in ECHO that allows Data Partners to associate a Group name with a given set of users. When a group is created, the group's owner specifies one or more ECHO users to be the group's manager(s). Group managers can be then added and removed after creation by other group managers. Group managers add members to their associated group. After becoming a member of a group, an ECHO user can be granted access to restricted metadata via the Data Management Service—refer to Chapter 6 for details.

Roles

ECHO regulates access privileges based on the concept of user roles. User roles are a way to grant a user access to the system. These roles facilitate greater flexibility with operation-level authorization and allow certain users the ability to have more than one role without having more than one account in the system.
As a Data Partner, you will be granted a role of **provider role**. You may have one or more provider roles, each of which is associated with one provider in the ECHO system. Your provider roles allow you to access and update information about the providers with which they are associated. For example, if you have a provider role for Oak Ridge National Laboratory (ORNL), then you can use the UpdateProviders operation of the ProviderService to update the contact information for ORNL.
When accessing the ECHO API, ECHO will automatically allow you to take advantage of your provider role privileges if you have only one

provider role associated with your user account. If you have more than one provider role, the ECHO client you are using to access the ECHO API must explicitly request that your generated token be associated with your privileged role.

> *Note: WIST does not currently allow an ECHO Data Partner to request a specific provider role. PUMP and the EIAT both facilitate privileged provider access based upon your chosen provider.*

To see a detailed breakdown of functionality by user type and role type within ECHO, see Appendix B, Functional Breakdown By User/Role Type.

Conditions

Conditions represent a partial equation to be evaluated as part of the Access Control (ACL) honoring system. The type of the condition defines the evaluation process. Temporal Conditions use a date range, so that a date associated with a granule can be compared against the date range to check for applicability of the condition. The primary use of conditions is to facilitate reuse among data rules. The same temporal condition can be used by both a restriction and a permission to control access to metadata. To extend a time range, you only have to change one **TemporalCondition** as opposed to changing multiple data rules. Another type of condition is **RestrictionFlag**, which can be used to restrict access to collections or granules based on the value of a **RestrictionFlag** metadata field. For example, this might be used to control access based on a granule's science quality.

Rules

Rules include conditions and provide a complete evaluation. Rules define which specific data is to be controlled, as well as the condition to use for evaluating whether the data should be controlled. Rules also contain a comparator, which is a key part of rule evaluation. Lastly, rules contain data including **ActionType** (describes which actions the rule applies to), and in the case of a permission, a **GroupName** (describes which Group the permission applies to). **Restrictions** (one type of a rule) apply to the global ECHO population, and **permissions** (the other type of a rule) apply to a specific group. Refer to Chapter 6 for details about using rules for data management.

Catalog Items

A **catalog item** is any metadata item (granule or collection) that is available for discovery and online access or ordering from the ECHO system. To find the desired catalog items to order, a query is submitted through the ECHO API's catalog service. The results of a query may return several granules or collections, which are uniquely identified by an ECHO **catalog item GUID** (CatalogItemId, which is an assigned XML metadata tag).
The catalog items that are included in the results for a user's submitted query are filtered based upon access control **rules** which have been defined by the Data Partner. Data Partner's may also override access control **rules** by setting a collection or granule's visibility or orderability in the provided metadata. Catalog items which have an associated online accessible URL will be made available for immediate access by ECHO Client applications.

Orders

An **order** is a collection of **catalog** items that a user would like to order from a Data Partner. Each catalog item in the order is associated with a quantity and order options, if order options are required for that item. Within ECHO, a user creates an order and then adds, deletes, and updates each item in the order before submitting the order to ECHO.

ECHO Order Structure

The contents of a user's order can span many providers. ECHO will organize catalog items associated with an order into what is called a **provider order**. The provider order contains the listing of catalog items that are associated with each provider. Since an order may contain orders from multiple providers, an order can consist of one or more provider orders. Each provider order can consist of one or more catalog items that belong to the same provider. To identify a specific provider order, you need the GUID of the order that includes that provider order and the GUID of the data provider associated with that provider order. Both of these GUIDs can be obtained through the ECHO API. When a full order is submitted, ECHO splits the user's order into separate provider orders and submits the appropriate provider order to each Data Provider.
The **OrderManagementService** allows users to create and change orders, provider orders, or individual catalog items. However, once the **SubmitOrder** operation is executed for an order within the **OrderManagementService**, the user can no longer execute any further changes on that order. A registered user may look at the current and historical status of any of their submitted orders.
Once a provider order is submitted to the appropriate provider, the status of that order can be changed in two ways:

- The Data Provider can send an immediate response, whether they will or will not accept the order, to an order submission.

- The Data Provider can wait and asynchronously use the **OrderProcessingService** to change the status of an order after they have had time to process the order.

The General Order Workflow

Orders Options

Data Partners often require additional information in order to fulfill a user's order request, or would like to make available additional processing options (e.g. parameter subsetting) for specific catalog items in an order. ECHO allows providers to create **order options** to describe the structure of the data which is to be requested by an ECHO client as well as how to display the order form to the user. An **order option** contains a unique name, description, XML order option form, scope, and sort key. The **scope** of an order option is always PROVIDER for order options that have been created by a data provider. There are also order options which have a scope of SYSTEM which are globally accessible order options available to all providers for inclusion in their order options.
Order options cannot be deleted from the ECHO system if there are orders in ECHO that utilize the order option. Providers wishing to replace an order option may choose to deprecate' an order option, which will allow existing orders to be fulfilled or reviewed, but not allow new orders to utilize the order option. For more information on how to create order options, see Chapter 7.

Orders Definition

Option definitions are an association between an **order option** and a dataset within ECHO's holdings. Multiple option definitions may exist for a single ECHO dataset. Data providers may choose to filter the order options that are displayed to a user for a specific collection based on metadata values which are found in each catalog item. For example, a provider may wish to have a specific order option displayed to a user if the quality flag in their metadata has a value of 5.

Orders Selection

An **OptionSelection** is a subset of the order option which contains the relevant order information that the provider has requested from the user. It is an ECHO client's responsibility to correctly display and order option and return a valid option selection for a specific order option.

Extended Services

An ECHO Extended Service is a functional capability offered by the community which can be used in coordination with the ECHO system. The services are "Extended" because they are not native to ECHO. ECHO Data Services can be many different things, from dedicated machines that transform or reduce the size of data, to innovative algorithms for discovering data that is relevant to particular research topics, to offerings by organizations to gather in data. ECHO is designed to support any type of related data service, enabling more innovative approaches to meeting the EOS mission. ECHO provides interfaces and mechanisms that allow organizations to publish their services and correlate their service to the data types in the clearinghouse.
An ECHO Service Partner is an individual or organization that participates with ECHO by providing access to functions that create Earth Science Data or information. ECHO advertises these services as well as brokers these services, as the Service Partner requests.